

CLAIMS

What is claimed is:

1. An electrophotographic image-forming apparatus having a photosensitive medium and a laser scanning unit, comprising:
 - a charging roller applying a predetermined voltage to the photosensitive medium;
 - a developing roller developing with a developing agent an electrostatic latent image formed on the photosensitive medium by a laser scanning unit;
 - a transfer roller transferring onto a sheet of recording paper the image developed by the developing agent;
 - a high voltage power supply applying predefined voltages to the respective charging, developing, and transfer rollers;
 - a charging roller resistance detection unit detecting a resistance value of the charging roller;
 - a transfer roller resistance detection unit detecting a resistance value of the transfer roller; and
 - a control unit determining a charging voltage to be applied to the charging roller based on the charging roller resistance value detected by the charging roller resistance detection unit and the transfer roller resistance value detected by the transfer roller resistance detection unit.
2. The electrophotographic image-forming apparatus as claimed in claim 1, further comprising a storage unit storing predetermined charging voltage values that correspond to the transfer roller resistance value and the charging roller resistance value, wherein the control unit selects a charging voltage value stored in the storage unit based on the transfer roller resistance value and the charging roller resistance value, and controls the high voltage power supply to apply the selected charging voltage value to the charging roller.
3. The electrophotographic image-forming apparatus as claimed in claim 1, wherein the charging roller resistance detection unit includes:
 - a charging roller resistance detector detecting current flowing between the charging roller and the photosensitive medium and calculating the charging roller resistance value based on a value of detected current ; and

an analog-to-digital (A/D) converter converting into a digital signal a signal corresponding to the charging roller resistance value output from the charging roller resistance detection unit and outputting the digital signal to the control unit.

4. The electrophotographic image-forming apparatus as claimed in claim 1, wherein the transfer roller resistance detection unit includes:

a transfer roller resistance detector detecting current flowing between the transfer roller and the photosensitive medium and calculating the transfer roller resistance value based on a value of the detected current ; and

an A/D converter converting into a digital signal a signal corresponding to the transfer roller resistance value output from the transfer roller resistance detector and outputting the digital signal to the control unit.

5. A charging voltage control method an electrophotographic image-forming apparatus having a charging roller applying a predetermined voltage to a photosensitive medium, a developing roller developing with a developing agent an electrostatic latent image formed on the photosensitive medium by an exposure unit, a transfer roller transferring onto a sheet of recording paper the image developed by the developing agent, a charging roller resistance detection unit detecting a resistance value of the charging roller, and a transfer roller resistance detection unit detecting a resistance value of the transfer roller, the method comprising :

calculating the charging roller resistance value between the charging roller and the photosensitive medium;

calculating the transfer roller resistance value between the transfer roller and the photosensitive medium; and

determining a charging voltage to be applied to the charging roller based on the calculated transfer roller resistance value and charging roller resistance value.

6. The charging voltage control method as claimed in claim 5, wherein the charging voltage determination step determines a predefined charging voltage value as the charging voltage to be applied to the charging roller that corresponds to the transfer roller resistance value and the charging roller resistance value.

7. An image forming apparatus comprising:
 - an image bearing drum having a photoconductive property;
 - a charging device to impart a potential to the surface of the drum;
 - a developing unit to coat an image formed on the drum with toner forming a toner image;
 - a transfer device configured to transfer the toner image to a recording medium, wherein the transfer device is disposed below the drum and the recording medium is interposed between the drum and the transfer device;
 - a resistance detection unit to measure the resistance of the charging device and the transfer device;
 - a control unit that controls voltage levels applied to the charging device, the developing device and the transfer device, wherein the voltage applied to the charging device is relative to the resistance values measured by the charging device resistance detection unit and the transfer device resistance detection unit; and
 - a fusing unit to fix the toner image on the recording medium.
8. The image forming apparatus as claimed in claim 7, further comprising a storage unit, wherein the storage unit stores image data used to form the image on the drum.
9. The image forming apparatus as claimed in claim 8, wherein the storage unit includes data that represents predetermined charging device voltage levels based on measured resistance values of the charging device and the transfer device.
10. The image forming apparatus as claimed in claim 9, further comprising a high voltage power supply responsive to signals from the control unit configured to apply specified voltage levels to the charging device, developing device and the transfer device.
11. The image forming apparatus as claimed in claim 7, wherein the resistance detection unit includes:
 - a first detection unit measuring the current flowing between the charging device and the drum and calculating the resistance value of the charging device from the measured current and applied voltage; and

a second detection unit measuring the current flowing between the transfer device and the drum and calculating the resistance value of the charging device from the measured current and applied voltage.

12. The image forming apparatus as claimed in claim 11, wherein the first detection unit further includes an A/D converter that transmits the calculated resistance value to the control unit.

13. The image forming apparatus as claimed in claim 11, wherein the second detection unit further includes an A/D converter that transmits the calculated resistance value to the control unit.

14. The image forming apparatus as claimed in claim 7, wherein the developing unit further includes:

a developing roller; and

a toner supply to supply toner to the developing roller wherein the image formed on the drum is coated with the toner forming the toner image.

15. A method of forming an image comprising:
determining a resistance value between a charging device and a photosensitive drum;
determining a resistance value between a transfer device and the photosensitive drum;
charging the charging device to a predetermined voltage level that is relative to the resistance values determined the charging device and the transfer device, to impart a potential to the photosensitive drum;

transferring an image to the photosensitive drum;

coating the image on the drum with toner forming a toner image;

transferring the toner image to a recording medium; and

fusing the image to the recording medium.

16. The method of claim 15, wherein the predetermined voltage level is selected from a table of voltage levels stored in a storage unit that corresponds to the resistance values determined for the charging device and the transfer device.